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PTO/SB/16 (02-01)

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It is a request for filing a PROVISIONAL APPLICATION FOR PATENT under 37 CFR 1.53 (c).

Express Mail Label No. EV 335 816 512 US Date of Deposit: May 19, 2003

J1046 U.S. PTO
60/471102**INVENTOR(S)**

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TITLE OF THE INVENTION (280 characters max)**CONDUCTIVE BUTTONHOLE INTERCONNECT****CORRESPONDENCE ADDRESS**

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ENCLOSED APPLICATION PARTS (check all that apply) Specification Number of Pages

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5

 Other (specify) Application Data Sheet. See 37 CFR 1.76**METHOD OF PAYMENT OF FILING FEES FOR THIS PROVISIONAL APPLICATION FOR PATENT (check one)** Applicant claims small entity status. See 37 CFR 1.27. A check or money order is enclosed to cover the filing feesFILING FEE
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The invention was made by an agency of the United States Government or under a contract with an agency of the United States Government.

 No. Yes, the name of the U.S. Government agency and the Government contract number are: _____Respectfully submitted,
SIGNATURE

Date 5/19/03

REGISTRATION NO.: 48,027

(if appropriate)

Docket Number: US030124

TYPED or PRINTED NAME AARON WAXLER

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Docket Number	US030124	Type a plus sign (+) inside this box →	+
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Number 2 of 2

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of

Atty. Docket

GEORGE MARMAROPOULOS, ET AL.

US030124

Serial No.

Group Art Unit

Filed: CONCURRENTLY

Ex.

Title: CONDUCTIVE BUTTONHOLE INTERCONNECT

Commissioner for Patents
Alexandria, VA 22313-1450

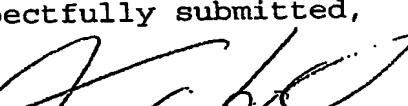
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Respectfully submitted,

By 
Aaron Waxler, Reg. 48,027
Patent Agent
(914) 333-9608

CONDUCTIVE BUTTONHOLE INTERCONNECT

BACKGROUND OF THE INVENTION

5 1. Field of the Invention

This invention relates to an interconnect system intended to permit the connection of an electronic device or power source to a fabric electric circuit embedded in a garment. More specifically, the invention relates to an 10 electrical interconnect system having an electrical interconnect device incorporated into the garment in a location or locations most conveniently accessible to the wearer.

15 2. Description of the Invention

Integrated electrical switches for use in clothing are typically sewn, glued, or otherwise mounted to clothing using standard "off the shelf" electric components, deemed well known in the art. However, to the best of the current 20 inventors' knowledge, the prior art devices in wearable electronic applications do not address the problem of assuring simple and intuitive electrical connectors so as to be fashionable.

25 Therefore, the present invention relates to garment electrical connectors that can be realized in simple,

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intuitive, reliable, and inexpensive implementation. Moreover, the present invention facilitates manufacture of such connectors as close as possible to the manufacturing techniques used in the garment industry for widespread 5 acceptance within the garment manufacturing industry.

SUMMARY OF THE INVENTION

The present invention discloses a wearable garment with 10 an electrical interconnect system, which includes a buttonhole having at least one conductive outer edge mounted to the body of the garment and a connector detachably coupled to the conductive areas of the buttonhole for coupling an external electronic device or power source. The electrical 15 interconnect system of this invention incorporates a buttonhole that can be easily manufactured with conventional buttonhole machines. The buttonhole is electrically coupled to a fabric circuit integrated in the garment material.

According to one aspect of the invention, a garment of 20 desired form and function can be constructed in a conventional manner using readily available fabrics and materials, and the electrical interconnect system can be positioned advantageously within a buttonhole that permits easy activation manually by a person. Necessary connection 25 cables or cords can extend from the interconnect system for connection to an electronic device embedded in the garment

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material or an external power source.

According to another aspect of the invention, a button having at least one conductive outer edge is attached to a first garment layer, which in turn is electrically coupled to 5 a first fabric circuit integrated in the garment material. The button is releasably coupled to a button hole having at least one conductive outer edge attached to a second fabric circuit integrated in a second garment layer, such that the first and second fabric circuits of the respective layers can 10 be electrically coupled together.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 illustrates an embodiment of an electrical interconnect system in accordance with this invention. 15 Figure 2 illustrates the electrical interconnect system of Figure 1 in accordance with a first embodiment of this invention.

Figure 3 is a detailed construction of the electrical interconnect system of Figure 1 and a connector in accordance 20 with the first embodiment of this invention.

Figure 4 illustrates the electrical interconnect system of Figure 1 in accordance with a second embodiment of this invention.

Figure 5 is a detailed construction of the electrical interconnect system of Figure 1 and a connector in accordance 25 with the second embodiment of this invention.

DETAILED DESCRIPTION OF THE DISCLOSED EMBODIMENT

In the following description, for purposes of explanation rather than limitation, specific details are set forth such as the particular architecture, interfaces, techniques, etc., in order to provide a thorough understanding of the present invention. For purposes of simplicity and clarity, detailed descriptions of well-known devices, circuits, and methods are omitted so as not to obscure the description of the present invention with unnecessary detail.

Referring now to Figure 1 of the drawings, a wearable garment 2 in accordance with this invention includes an electrical interconnect device 12 and a connector 16. The connector 16 comprises a cable extending from the interconnect device 12, with the cable being coupled to a power source or other external electronic device. In the embodiment illustrated in Figure 1, the wearable garment 2 has the form of a conventional sleeveless top shirt, although it will be understood readily that the shirt alternatively may be either long-sleeved, short-sleeved, vest, or jacket, for example. In addition, the materials of garment 2 may be either natural or synthetic, and the fabric created from such materials can be either woven or sheet-formed in any well-known manner.

Referring to Figure 2, one side of the garment 2 is

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provided with the electrical interconnect system 12, which includes an opening 10 defined by an outer ring 11 having one or more conductive area 11a at both ends thereof. The provision of the opening 10 to the fabric is well known to the skilled person, as are variations in such attachment detail. The outer ring 11 is electrically coupled to a conductive track of a fabric circuit 4, which may be provided in the form of loops to receive or otherwise engage equipment considered ancillary to the interconnect system 12, such as 5 an external heart-monitoring device, external defibrillator, or other electronic devices. Alternatively, such ancillary equipment or other electronic devices may be integrated in the garment 2 and used in conjunction with the interconnect system 12 for transmitting the desired signals or power in 10 any well-known manner.

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Referring to Figure 3, the connector 16 that allows the connection of a power supply or an external electronic device as described above comprises a button connector 40 having one or more conductive surfaces 40a that may be electrically 20 coupled to the conductive areas 11a of the outer ring 11 for transmitting signals or power. As shown, the button connector 40 has a shape adapted to interconnect releasably with the respective conductive areas physically and electrically with each other. Accordingly, a wearer can engage an 25 ancillary device readily by merely mounting the button connector 40 with one hand to the proper opening of the

garment. It will be understood readily by those having skill in this art, that in this embodiment of the invention, any connecting cable 16 extending from the button connector 40 can be coupled without difficulty to an ancillary device such 5 as a cell phone, radio, pager, GPS device, personal communication assistant, or other signal transmitter or duplex interactive system, carried anywhere on the person of the wearer of the band.

Figure 4 illustrates the electrical interconnect system 10 12 according to another embodiment of this invention. As shown, one side of the garment 2 is provided with a button component 20 having one or more conductive area 20a. The conductive area 20a of the button component 20 is electrically coupled to a conductive track of a fabric 15 circuit 4. It is noted that the button component 20 in proper position on garment 2 formed by ordinary garment materials can be accomplished easily using well-known sewing and or other fabric-attachment techniques. The materials of such garment may be either natural or synthetic, and the fabric 20 created from such materials may be either woven or sheet-formed in any well-known manner.

Referring to Figure 5, the button component 20 may be joined together with the outer ring 11a with a releasable locking action by the wearer. In this embodiment, a wearer 25 can engage the interconnect system 12 readily by merely fastening the button connector 20 of a first layer of the

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garment 2 to the outer ring 12 of a second layer of the garment 2. The two layers joined together can be made to be water-resistant or waterproof in the area forming the interconnect system 12 to provide additional protection.

5 It should be noted that the conductive track of the fabric circuit 4 coupled to the button connector 20 may be provided in the form of loops to receive or otherwise engage equipment considered ancillary to the interconnect system 12, such as a heart-monitoring device, defibrillator, and other 10 electronic devices that are integrated in the garment 2 and used in conjunction with the interconnect system 12 for transmitting the desired signals or power in any well-known manner.

While the preferred embodiments of the present invention 15 have been illustrated and described, it will be understood by those skilled in the art that various changes and modifications can be made, and equivalents may be substituted for elements thereof without departing from the true scope of the present invention. For example, although an elliptical-shaped interconnect system is shown for illustrative 20 purposes, it is to be understood that the present invention can support other shapes. Thus, the shape of an interconnect system in the drawings should not impose limitations on the scope of the invention. Therefore, it is intended that the 25 present invention not be limited to the particular embodiment disclosed as the best mode contemplated for carrying out the

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present invention, but that the present invention include all
embodiments falling within the scope of the appended claims.

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What is claimed is:

1. An interconnect apparatus comprising:
a wearable garment having a body structure; and
at least one interconnect element having at least one
electrically conductive contact portion and an opening, said
interconnect device coupled to a fabric circuit integrated in
said garment.
2. The interconnect apparatus of Claim 1, further
comprising a connector having at least one electrically
conductive contact portion, said connector being releasably
coupled to said interconnect element.
3. The interconnect apparatus of Claim 2, wherein said
connector further comprises a cable extending therefrom.
4. The interconnect apparatus of Claim 3, wherein said
cable serves as a coupling to an electronic device.
5. The interconnect apparatus of Claim 3, wherein said
cable serves as a coupling to a power source.

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6. The interconnect apparatus of Claim 2, wherein said interconnect device is mounted on the outer surface of said garment for engaging and supporting units ancillary to transmitting electronic signals.

7. An interconnect apparatus comprising:

a wearable garment having a body structure;

at least one interconnect element having at least one electrically conductive contact portion coupled to a first fabric circuit integrated in a first layer of said garment;

and,

a connecting element having at least one electrically conductive contact portion coupled to a second fabric circuit integrated in a second layer of said garment,

wherein said interconnect element engages the connecting element via a releasable locking action so that the respective conductive contact portions come in contact electrically.

8. The interconnect apparatus of Claim 7, wherein said first and second fabric circuits are coupled to a signaling device.

9. The interconnect apparatus of Claim 7, wherein said first and second fabric circuits are coupled to electronic devices integrated in the body structure of said garment.

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10. The interconnect apparatus of Claim 6, wherein said connector is a button.

11. A method for permitting a person to activate an electronic device conveniently, said method comprising the steps of:

attaching at least one fabric circuit in a wearable garment;

mounting an interconnect device having at least one conductive contact portion to said wearable garment;

dressing said person in said wearable garment; and,

selectively coupling a connector having at least one conductive contact portion to said interconnect device to serve as a coupling to an electronic device or a power source.

12. A method for permitting a person to activate an electronic device conveniently, said method comprising the steps of:

attaching at least one fabric circuit in a first layer and a second layer of a wearable garment;

mounting an interconnect device having at least one conductive contact portion to the first layer of said wearable garment;

mounting a connector having at least one conductive

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contact portion to the second layer of said wearable garment;

 dressing said person in said wearable garment; and,
 enclosing two layers of said wearable garment by
 engaging said connector to said interconnect device so that
 the respective conductive contact portions come in contact
 electrically.

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ABSTRACT OF THE DISCLOSURE

A wearable garment, usable by athletes, workers, and the elderly or infirm, incorporates an easily operated manual interconnect device, so that a user wearing the garment can operate the interconnect device by merely coupling a connector, which is in turn coupled to a power source or external electronic device. Through a releasable locking action by the user, the connector is electrically coupled to the interconnect device, which is coupled to a fabric circuit integrated in the garment, such that operation of a locking action activates related ancillary equipment such as power supplies or electronic devices.

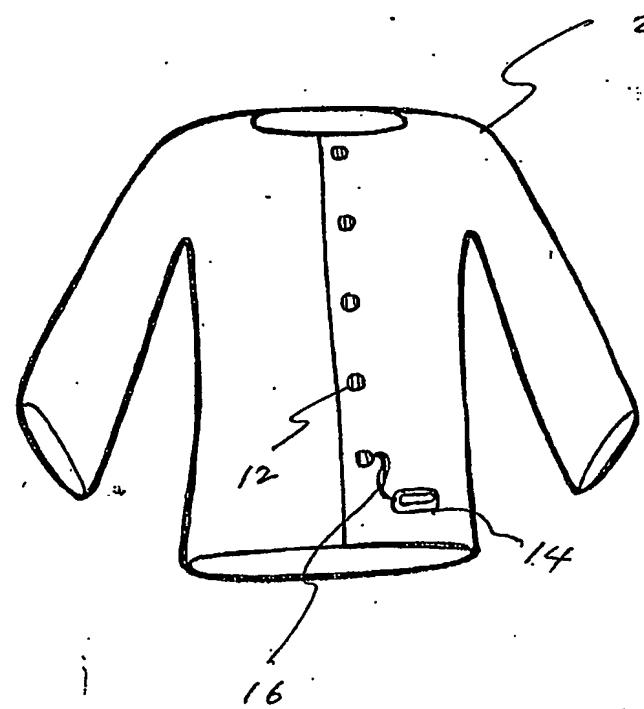


FIG. 1

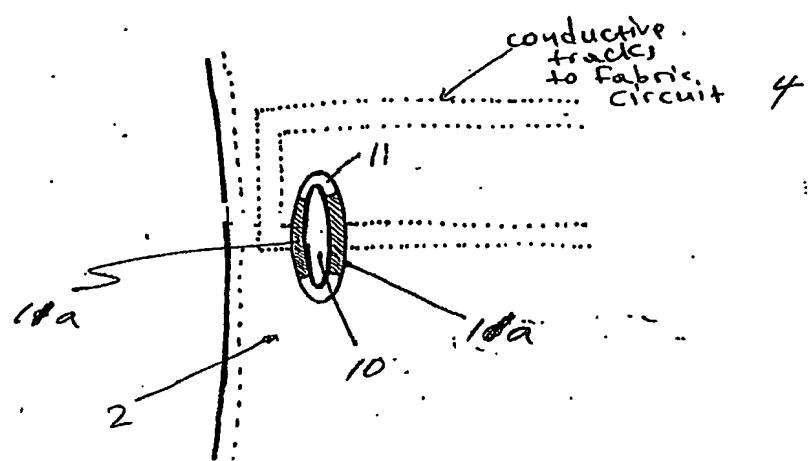


FIG. 2

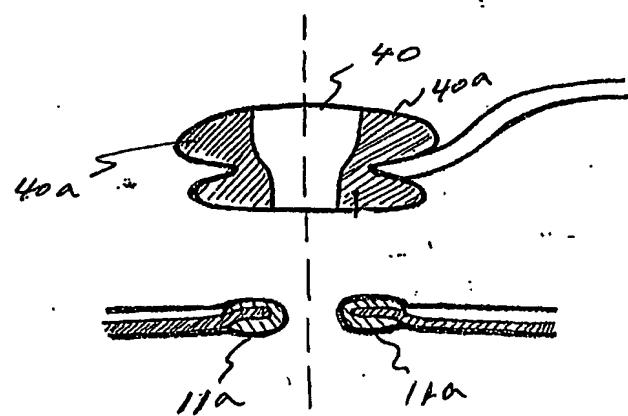
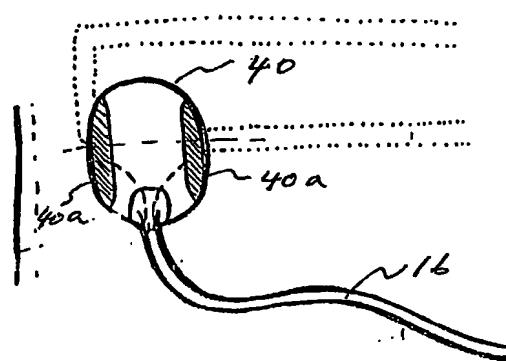


FIG. 3

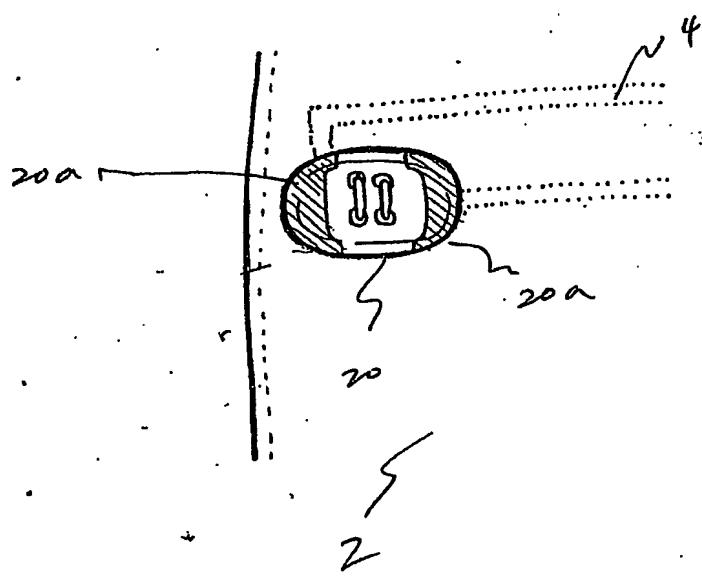


FIG. 4

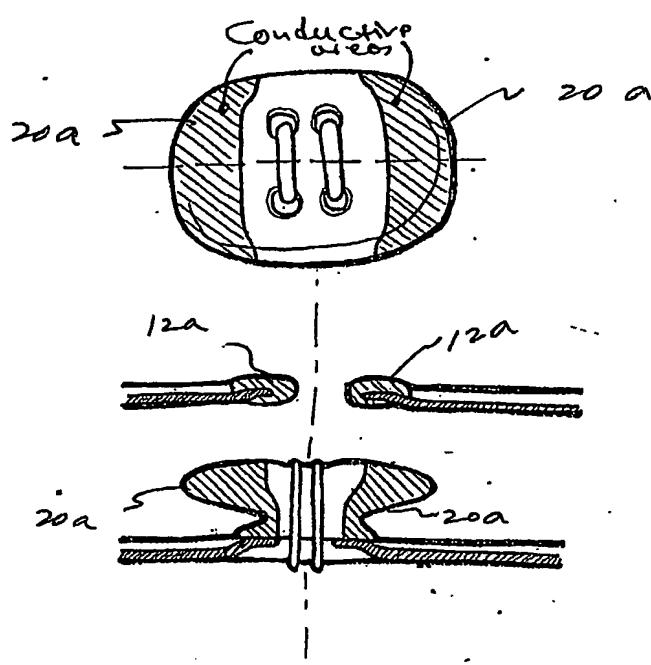


FIG. 5

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